



# AFTER ACTION REPORT

## *Cursor On Target International User Group Meeting 2014*

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Case# : 14-1642

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## Table of Contents

1	Introduction.....	1
2	Agenda .....	3
3	Technical Architecture .....	4
3.1	Overview .....	4
3.2	Conferencing Tools.....	4
3.3	The Virtual Environment .....	6
3.4	Pre-Meeting Preparation .....	7
3.5	DIGEX Coordination During the Event .....	8
4	MITRE Assessment .....	8
4.1	Planning and Execution .....	8
4.2	Network Architecture .....	15
4.3	DIGEX.....	15
4.3.1	DIGEX Coordination .....	15
4.3.2	What went right.....	16
4.3.3	What went wrong.....	17
4.3.4	What could be done better .....	17
4.4	Requirements Gathering .....	18
4.5	ACME Lab support.....	20
4.5.1	What went right.....	20
4.5.2	What could be improved -- Recommendations for next year .....	21
4.6	Presentations.....	21
4.6.1	CoT-NIEM .....	21
4.6.2	CoT SDK 2.0 .....	22
4.6.3	CoT Mil-Standard .....	23
5	Attendee Meeting Feedback.....	24
5.1	Assessment: What the Feedback tells us .....	24
5.2	General feedback.....	25
5.3	Day 1 feedback (International Day).....	27
5.4	Day 2 feedback (US-only participation) .....	28
5.5	Survey Comments .....	30
6	CoT User Group Pictures .....	34
7	Summary.....	41
	Appendix A: CoT-enabled System Poster Samples .....	42

Appendix B: Participant Statistics ..... 49

# 1 Introduction

Cursor On Target (CoT) is a technical approach for enabling systems to communicate time sensitive position, or "What, When, Where", information. CoT leverages Extensible Markup Language (XML) technology and defines an extensible message format for communicating this information. *The schema are supported by a suite of powerful applications that facilitate data translation, software development, and system integration. CoT translators exist for Link-16, VMF, Google Earth and FalconView. CoT is operationally deployed 24x7 worldwide in over 300 systems.*

MITRE works in the role of System Engineer for the Cursor on Target Program Office (managed by AFLCMC/HNAG at Hanscom AFB). MITRE not only provides Configuration Management / Change Control for the schema and key applications, we also provide "best practices" for development of CoT-enabled systems, deployment of CoT data architectures, and concepts for integration of CoT into Enterprise networks. With over 1,700 users in the CoT User Group, MITRE (as directed by our government customers) endeavors to provide training and venues for exchanging information, future requirements, and operational concerns. The key event each year is our CoT Annual User Group Meeting, which has historically been hosted in the Boston area.

This year's 5<sup>th</sup> Annual User Group Meeting built upon the 2013 Meeting, which was opened for the first time to International participation to address the growing international interest in CoT.

The challenge of foreign participation is based upon our constraints in sharing technology with non-US citizens; International Traffic in Arms Regulations (ITAR) require State Department approval for such discussions. Recognizing these restrictions, we developed presentations that were suitable for Public Release and split the meeting into two sessions. Invitations were sent to known international users of CoT with the notice that we would welcome all users / potential users on the first day of the meeting. On the second day, we restricted our invitations to US citizens with a "need to know" as FOUO material would be discussed.

Additionally, understanding that the budgetary impact of Sequestration would dramatically limit the ability of our US government users to travel, we developed a virtual environment for not only presentations but also Integration Testing of CoT-enabled systems.

We had four primary goals for the Annual Meeting:

- Provide interesting presentations that demonstrate the value of Cursor on Target
- Present technology updates and recommended "best practices" for development and deployment of CoT-based systems
- Conduct a Digital Exercise (DIGEX) to enable integration and testing of user CoT-enabled systems
- Provide training for CoT developers and system architects

The attendees consisted of 92 people who physically met in the MITRE-Bedford location, and 62 who attended virtually. We had 10 people who participated in the DIGEX.

We received 43 completed surveys from the attendees, and feedback indicates that the FY14 Annual user Meeting was a success from the perspective of the participants. When compared to the feedback from 2013, ratings went up in all categories.

## 2 Agenda

Topic	Presenter	Time	Comments
<b>DAY 1: 1 April 2014</b>			
Introduction	Jon Jacoby (MITRE)	0800 – 0830	<ul style="list-style-type: none"> <li>Welcome</li> <li>Meeting framework and concept</li> <li>Desired outcomes</li> <li>Logistics</li> </ul>
ITAR Briefing	Karl Abendschein (MITRE)	0830 – 0845	<ul style="list-style-type: none"> <li>Identify constraints regarding what is being presented, what can be discussed</li> <li>All presentations must be Approved for Public Release</li> <li>Who to contact for additional information</li> </ul>
Use of CoT in Fire Fighting	Luke Savoie (ForceX)	0845 – 0915	
Use of ISR to facilitate International Operations	Paul Hastert (HAF/A2I)	0915 – 0945	<ul style="list-style-type: none"> <li>Common requirements</li> <li>System Integration</li> </ul>
Enterprise Integration DIGEX overview	Mike Dinsmore (MITRE)	0945 - 1015	<ul style="list-style-type: none"> <li>Scenarios</li> <li>Gaming rules</li> <li>Evaluation criteria</li> </ul>
<b>BREAK</b>		1015 - 1030	
Android Tactical Assault Kit (ATAK) Licensing Opportunities	Ralph Kohler (Air Force Research Lab)	1030 - 1115	<ul style="list-style-type: none"> <li>ATAK Capabilities / Architecture</li> <li>Movement to Open Source</li> </ul>
Battlefield Air Operations (BAO) Kit	Major Tim Forbes (AFLCMC/WISN)	1115-1200	<ul style="list-style-type: none"> <li>Presented by Capt Jonathan Wing</li> </ul>
<b>LUNCH</b>		1200 - 1300	
Geospatial Routing: A Reference Architecture	Matthew Kern (Federal Enterprise Architecture Certification Institute)	1300 – 1345	<ul style="list-style-type: none"> <li>Search and Rescue</li> <li>Interface between Military and Civilian organizations</li> <li>Counter Terrorism</li> </ul>
AFLCMC support for FMS Cases	Don Seta (AFLCMC/HNAD)	1345 - 1415	
Use of CoT for delivery of Weather data	Major Owen Somers (AFLCMC/HBAW)	1415 - 1500	<ul style="list-style-type: none"> <li>FalconView integration with weather data</li> <li>Discussion of tools and capabilities</li> </ul>
CoT Fundamentals	Ernie Carozza (MITRE)	1415 - 1500	
CoT DIGEX	Mike Dinsmore (MITRE)	1415 - 1545	
CoT SDK 2.0 Tutorial	Laura Bonanno (MITRE)	1500 - 1545	
<b>BREAK</b>		1545 - 1600	
Wrap-Up	Bill Leavis (AFLCMC/HNAG)	1600 - 1630	<ul style="list-style-type: none"> <li>DIGEX results evaluation</li> <li>Gather feedback from users regarding Day 1</li> </ul>

<b>DAY 2: 2 April US Only</b>			
Morning Kickoff	Jon Jacoby (MITRE)	0800 – 0815	
CoT-NIEM	Lizzie DeYoung (MITRE)	0815 - 0845	<ul style="list-style-type: none"> <li>• Requirements</li> <li>• Design</li> </ul>
Small UAV RF emitter Geo-location	Jason Bales (Azure Summit)	0845 - 0915	
Digitally aided PR in low intensity conflict	Col Steven Butow (129 <sup>th</sup> Rescue Wing)	0930- 1000	
BREAK		1000 - 1015	
Use of CoT in Wide Area Surveillance	Luke Savoie (ForceX)	1015 - 1100	
AFSOC Use of CoT: BAO Kit	Major Tim Forbes (AFLCMC/WISN)	1100 - 1130	<ul style="list-style-type: none"> <li>• Presented by Stephen Danforth</li> </ul>
ATAK Roadmap	Ralph Kohler (Air Force Research Lab)	1130 - 1200	
<b>LUNCH</b>		1200 - 1300	
CoT Mil-Standard	Mike Cokus (MITRE)	1300 - 1400	<ul style="list-style-type: none"> <li>• Current Status</li> <li>• Issue discussion</li> </ul>
Requirements Gathering for FY14 / FY15	Jon Jacoby (MITRE)	1400 - 1530	
CoT DIGEX	Mike Dinsmore (MITRE)	1400 - 1530	
Wrap-Up	Bill Leavis (AFLCMC/HNAG)	1530 - 1600	DIGEX results evaluation Gather feedback from users regarding Day 2

## 3 Technical Architecture

### 3.1 Overview

Past user group meetings have consisted of presentations, discussions, and integration scenarios with real CoT systems on a local area network. While this year's meeting was planned in a similar format, it was highly desirable to extend the meeting to remote users as well. For the presentation and discussion portions of the meeting, a conferencing tool was required to share audio and slides. Coordinating a digital exercise that allowed remote users to connect to a local network was more complicated. The decisions to use Defense Connect Online (DCO) and MITRE's Information Sharing Experimentation Environment (ISEE) to conduct the virtual aspect of the user group meeting met the requirements and worked well for most of the event.

### 3.2 Conferencing Tools

In designing the infrastructure, we selected our tools based upon the following requirements:

- Must be able to share audio and slides
- Should be able to share video
- Must allow external users to deliver presentations as well as listen
- Must be able to verify the identity of external users, if access needs to be limited to US citizens



- Must be able to handle at least 200 connected users

At the 2013 CoT users Group Meeting, Microsoft Lync was selected as the conference tool, due to its successful use within MITRE. There are two main limitations with using Lync hosted at MITRE for this event:

- Users outside of MITRE can join as guests, but there is no way to coordinate accounts with them in advance. In small meetings, this is acceptable, since the identity of guests can be verified by voice. For a large meeting such as this, that is not practical.
- Both in Lync 2010 and Lync 2013, the ability to receive audio as a client requires the installation of additional software with an administrator account. This was problematic at the 2013 CoT users' Group meeting for many users, in particular government users, who do not have administrative privileges on their machines.

With respect to the other requirements, both versions of Lync were judged to be adequate. This year, Defense Connect Online (DCO) was selected as the conferencing tool specifically because it offers some improvement for these two above points:

- DCO also does not provide pre-coordination of guest accounts, and so it suffers from the same troubles as Lync for "guests." However, on DCO, only users who do not have a Common Access Card (CAC) join as guests, whereas with Lync, all non-MITRE employees would join as guests.
- There are two variants of the DCO web client. For users who do not need to present or use their microphones, only Adobe Flash is required. Since all modern computers have Flash installed already, using DCO reduces the installation troubles for users as well as the amount of time CoT Program Office staff need to spend performing helpdesk services.

In either case, the most challenging requirement was related to identification of external users. For some discussions, we needed to limit participation to US citizens only. Ideally, we would be able to pre-coordinate "guest accounts" for remote users to ensure only authorized users would have access. The only option at this point in time is for users to join as "guests," supplying a guest name, and waiting for a host to admit them to the meeting.

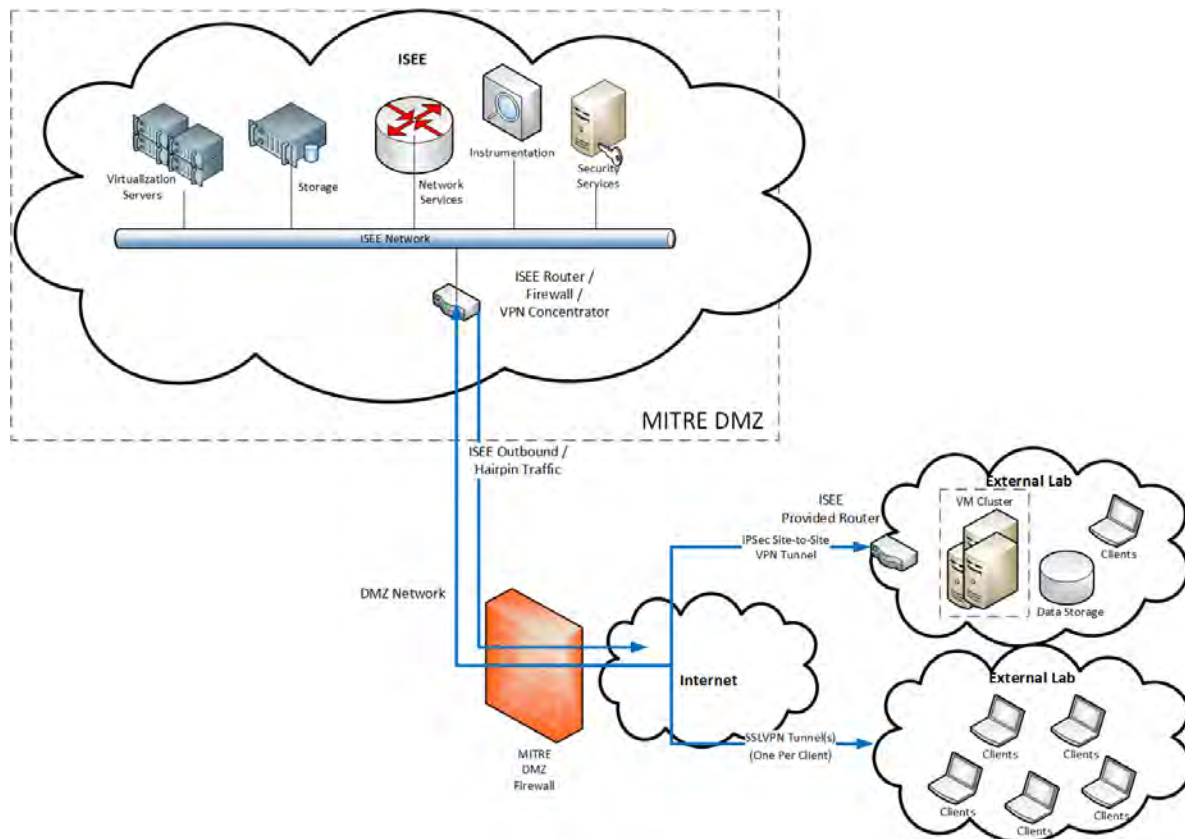
One drawback of DCO is that it is purely web based – there is no option to dial a phone number. This presented a problem for a remote presenter who informed CoT Program Office staff an hour before presenting that he did not have a PC microphone. As a stopgap, CoT Program Office staff created a Lync conference and quickly implemented a bridge between the Lync conference and DCO conference. The remote presenter was able to use the Lync conference number for bidirectional audio during his presentation. The steps to configure the bridge are outlined:

- Set up a computer connected to the DCO meeting. Have this user promoted to “Presenter” so that it can speak.
- Set up a second computer connected to the Lync meeting.
- Using two 3.5mm audio cables, connect the speaker output and microphone in ports on the two computers in “cross over” configuration: speaker output connected to microphone input on the other.
- Adjust volume levels on both computers to an acceptable level.

### **3.3 The Virtual Environment**

A highlight of past user group meetings was the ability for developers to bring their systems onto a network, exchange CoT messages with each other, and receive feedback from other users. This is helpful for new systems as well as existing systems, as they have the opportunity to test and rapidly integrate with other systems.

This year, a local area network was setup in the Agile Capability Mashup Environment (ACME) Lab at the Bedford MITRE office to connect user group meeting attendees who arrived in person. We also wanted to support “virtual collaboration” by enabling external users to connect into this network. MITRE’s Information Sharing Experimentation Environment (ISEE) provided the infrastructure to support this. ISEE is a MITRE CI&T resource that provides a virtual sandbox, enabling users from disparate locations to connect and collaborate over an IP network.



**Network Architecture**

Inside the ISEE network, a virtual local area network (VLAN) was created for the CoT User Group Meeting. External users were given the ability to tunnel into this network via a virtual private network (VPN). At the MITRE Bedford office, where user group meeting attendees arrived in person, ISEE provided a router that formed a site-to-site VPN with the ISEE lab network. The hub of CoT traffic on the network was a virtual machine (VM) on the CoT VLAN. This VM hosted the CoT router, used to receive and distribute all CoT messages generated by participating systems. By leveraging the existing infrastructure of ISEE, little additional effort was required to build this network and make it available to users. Future events could also provide an InfoSec approved wireless access point for local participants that wish to send/receive CoT using mobile devices.

### 3.4 Pre-Meeting Preparation

Starting in February, CoT Program Office staff conducted weekly or biweekly tests of our MITRE facility, the audio system through DCO, and the Digital Exercise VPN environment. We conducted some of these tests for periods in excess of 4 hours, including simultaneous DCO meetings to verify compatibility with lab systems and determine administrative requirements for the event. We set up a PC on MITRE's "Outernet" to test the system from the perspective of online users.

Some of these tests were performed in the auditorium used for the event. For these tests, MITRE's Corporate Audio/Visual Services (CAVS) participated to simulate the real setup. This event was the first that CAVS supported that used DCO rather than Lync, so the extra time to test the system proved very helpful.

### 3.5 DIGEX Coordination During the Event

In order to remotely participate in the digital exercise (DIGEX), users were instructed to contact the CoT Program Office for assignment of login credentials. These users received an email with connection instructions and access to the Cisco AnyConnect VPN client, used to connect into the DIGEX network.

Once users are networked inside the VPN, there is a need to coordinate configuration (ports, protocols, IP addresses) and exercise activities. To support DIGEX coordination and collaboration, a separate DCO conference was setup in parallel to the one used for presentations and discussions. In the ACME Lab, where the DIGEX was physically hosted, microphones and the integrated sound system enabled verbal communication with remote attendees. Instant messaging was also available via DCO when voice wasn't an option. To keep track of network configuration, such as port numbers and IP addresses, a web page was hosted on the network that could be updated as new users came on the network.

## 4 MITRE Assessment

### 4.1 Planning and Execution

We initiated planning for the FY14 User Group meeting as soon as we were permitted to do so. One effect of Sequestration was that we had to impose a "Stop Work" on all CoT-related program work until the end of October, so we held our kickoff meeting in November. In retrospect, this delay had no measurable impact upon our execution or performance.

Key tasks in this year's execution of the User Group meeting, and associated "lessons-learned":

Task	Description	Lessons-learned
Kickoff meeting	Identify roles, responsibilities, draft schedule, desired outcomes	Needs to be conducted in October or November, with follow-up meeting in mid-December

Task	Description	Lessons-learned
Selection of meeting facilities	Identify options for hosting the meeting. Evaluate availability of food / drink, meeting expenses, security, parking, availability of meeting rooms for sidebar discussion (including Classified meetings)	<p>MITRE facilities continue to come out on top in the selection process. Cost is built into the AF contract, and Security is built-into the environment.</p> <p>There are ample meeting rooms which can hold from UNCLASS up to TS/SCI sidebar discussions.</p> <p>If the C Building auditorium (2C130) is reserved, there is ready access to the cafeteria and Starbucks coffee bar in an area where all can travel without escort.</p> <p>Use of the ACME facilities adjacent to 2C130 provides an excellent venue for collaboration, presentations, and training.</p> <p>The key is early reservation of 2C130 and the ACME lab facilities. Recommend that this be done in early October for an April meeting.</p>
Call for papers	Submit request for presentations, identifying any unifying theme(s) and key Stakeholder participation	<p>We waited too long, submitting this request in January. We should have done so in November.</p> <p>One of the challenges with doing so is that many presenters / organizations do not have core competencies in the areas of long-term planning and scheduling. Moreover, even under perfect circumstances, Operational Requirements must trump ancillary activities (like participation in a User Group Meeting).</p> <p>Given the uncertainty associated with our planning Agenda, recommend that at least one presentation be developed as a backup for the International Day (presentation must be approved for Public Release) and one for US-only Day (if a MITRE presentation, must go through the Limited Release process).</p>

<b>Task</b>	<b>Description</b>	<b>Lessons-learned</b>
Effective management of CoT User Group contact information	Maintain a current list of users, identifying which users possess US citizenship; keep email and phone numbers up to date	The CoT Program Office was negatively impacted by the massive change of email addresses occurring in FY14. Many of the emails were undeliverable, and we needed to continually search the Global Address List (GAL) in attempt to keep in contact with the users. This problem was exacerbated in that the MITRE GAL only updated the Air Force addresses (e.g., we were missing USSOCOM, Army, Navy, USCG addresses), and currency from one day to the next was inconsistent. In some cases we needed to use “word of mouth” to communicate news about the Meeting.
User credentials	Identify those users who have both US citizenship and “need to know” for participation in Day 2 (US Only) meetings and technical exchanges.	<p>We were able to leverage the CoT User List file to pre-clear those who we had already validated for access to the CoT sharepoint site on SoftwareForge.mil.</p> <p>However, for classified meeting sidebars, we still requested that individuals send their credentials via JPAS. We coordinated with MITRE security, and established expectations regarding the processing of JPAS or faxed information. We requested that each submission include the phrase “CoT User Group Meeting”, which assisted our security team in processing the requests.</p>
Security preparation: Physical attendance	Prepare for arrival of meeting attendees	<p>Develop list of anticipated participants; prepare name badges; identify all foreign participants, who require MITRE escorts; coordinate with MITRE-Bedford to ensure that sufficient parking would be available for attendees.</p> <p>Signs that were supposed to direct attendees to auxiliary parking SE of E Building did not get posted. This generated negative feedback from a couple of attendees.</p>

Task	Description	Lessons-learned
Security preparation: Virtual attendance	Prepare for attendance via web / teleconference	Develop list of anticipated participants; arrange separate login ids for International Day and US-only Day; coordinate with MITRE Infosec to assess network security and data processing; develop process for authentication of attendees. Note that there will be a cost for the assessment (~ 2 staff days).
Information Assurance	Develop plans to process documents and data, ensuring that ITAR constraints are taken into account.	<p>Coordinate early and often with both MITRE Information Assurance and Export Compliance organizations. Allow sufficient time for review and approval of documents provided to the user community.</p> <p>We failed to allow sufficient time for this task. Part of the associated problems were generated by late arrival of the presentation materials (2 presentations arrived the day of the meeting itself). Recommend that we put a hard delivery date on submittal of papers next year, e.g., 90 days prior to the meeting. Note that this may be an unachievable goal due to: 1) lack of commitment to participate on the part of the presenters; and 2) last-minute cancellations due to Operational and other priorities.</p> <p>As mentioned previously, recommend that there be a minimum of one presentation per day that is developed as a contingency.</p>
Communication Plan	Develop plan to effectively promote the User Group meeting	<p>Although we started ramping up communications to the users in January, this was too late, and the users were insufficiently committed to attend the meeting until very late in the game. Our inability to create early commitment led to rapid-reaction drills and a lot of stress for the CoT team.</p> <p>Note that this pattern of “late commitment” is a recurring problem.</p>

Task	Description	Lessons-learned
		<p>Approximately 60 percent of the attendees commit to participating within 30 days of the meeting. See Appendix B for statistics.</p> <p>Recommend that we subsume this plan into an overall Communication Plan for the CoT Program Office, clearly setting Milestones and expectations for coming events and deliverables.</p> <p>Key deliverables associated with the User Group Meeting include:</p> <ul style="list-style-type: none"> <li>• Emails to users starting in November, identifying schedule of events and unifying theme(s). "Hold the Date!" message should be incorporated. Also, solicit presentations and system demonstrations.</li> <li>• Call for CoT-Enabled System documentation (see Appendix A for examples) in January. Note that some system information may not be suitable for Public Release.</li> <li>• Hansconian article, submitted through Hanscom Public Affairs (PA). Submit 45 days in advance of the meeting, for publication 14 days prior to the meeting. Work with PA to see if the article can be promoted to the AF Journal.</li> <li>• MITRE Announcements and Information Displays (MAID). Arrange to have CoT User Group meeting information displayed one month prior to the meeting, and the week immediately prior to the meeting.</li> </ul>



Task	Description	Lessons-learned
		<ul style="list-style-type: none"> <li>• MITRE Monday Update: arrange for publication on the two Mondays prior to the meeting.</li> <li>• MITRE FASTJUMP: arrange for website to be set up, and post both Agenda and appropriate presentation materials.</li> </ul>
Application Development	Seek to provide new applications or schema for technical discussion and evaluation	We allowed ourselves a little slack in this area. Initially, the goal was to have the CoT SDK 2.0 and the CoT-NIEM translator available for release at the time of the User Group Meeting. As events evolved, we determined that this was too aggressive, and settled for in-depth discussion of the design and capabilities, and demonstrations of the technology as of the date of the meeting. This approach appeared to satisfy the user community.
Network Test	Ensure that network architecture is stable and accessible	<p>We published multiple emails advising the users of the architecture and login requirements. User Connectivity Testing was accomplished during the week immediately prior to the Meeting. Even so, some users failed to take proactive measures to ensure that they could hear the audio and view the video of the presentations. One presenter waited until 90 minutes before his presentation to let us know he had not properly prepared his computer for connecting to our network.</p> <p>Bottom line is that there will always be a need to react to unexpected situations.</p>

Task	Description	Lessons-learned
Meeting execution	Adhere to the Agenda, providing an effective learning and collaboration experience	<p>For the most part, things worked well.</p> <p>However, we ran into a situation where two different presentations scheduled for Day 1 had not yet been approved for Public Release. As a risk mitigation, we overbooked a timeslot, anticipating that one (or both) presentations would not be delivered. As things turned out, both presentations were approved on the day of the presentation, and we ended up with too many things occurring at the same time. The overlap in activities was not well communicated to the audience, and confusion occurred.</p> <p>Presentation overlap may be a necessary evil with so many moving parts in a complex meeting environment, but we need to do better with regard to meeting management in the future.</p>
Presentation assessment	<p>Ensure that presentations:</p> <ol style="list-style-type: none"> <li>1) Are appropriate for the audience</li> <li>2) Address CoT capabilities, gaps, concerns</li> <li>3) Are delivered by someone familiar with the material</li> </ol>	<p>Some of the speakers were not well-prepared. For next year's event, would recommend that we host a walk-through of the presentations during the week immediately prior to the User Group Meeting. During that session, not only can the presenter gain the benefit of a dry run, but the CoT Program Office can ensure that the material is suitable for delivery to the User Group.</p>

## **4.2 Network Architecture**

DCO as a conference tool performed well for most of the two day event. There was a significant outage from about 1445 to 1515 on the first day of the event that affected all DCO users, local and remote, on multiple DCO meetings. During this time, part of the CoT SDK briefing could not be broadcast online, and the remote DIGEX users had trouble communicating with the hosts. At around 1515, DCO stabilized again, and users were able to reconnect. As far as we can tell, we had no control over this outage and could not have resolved it on our own. It is possible this is an indication of instability of DCO as a conferencing tool.

Aside from the connection outage, DCO provided significant improvements. CoT Program Office staff spent significantly less time during the event performing helpdesk actions and admitting users than in 2013.

Audio in the auditorium over DCO worked very well with the exception of questions from the local audience. In many cases, audience members did not turn on their table-mounted microphones. Often we were unable to notice or interrupt the speaker to turn their microphones on, so the audio available to the remote users on DCO would momentarily go quiet. Use of the microphones in the ceiling of the auditorium was considered, but ultimately turned off to avoid audio looping and accidental broadcast of side conversations.

The level of participation in the Digital Exercise was lower than expected. This was partially due to its priority in scheduling. In addition, it is possible that communication of the event was not clear. At previous CoT User Group meetings, many users, in particular contractors, were very interested in bringing their systems to demonstrate and integrate with others. It is possible that asking users to participate in the “digital exercise” is too opaque for them to want to invest time and resources. In the future, if we are to continue with this part of the event, it should have a dedicated block of time and should be advertised along the lines of “connecting to a network with other users and simulation systems for demonstration and integration.”

## **4.3 DIGEX**

### **4.3.1 DIGEX Coordination**

The Digital Exercise (DIGEX) supported both local and remote participation. Local participation was hosted in MITRE’s ACME lab in Bedford, MA and the remote participation was achieved through a Virtual Private Network (VPN) data connection combined with a Defense Connect Online (DCO) collaboration tools session. Remote participants received login credentials for the Cisco AnyConnect VPN client by email after contacting the CoT Program Office.

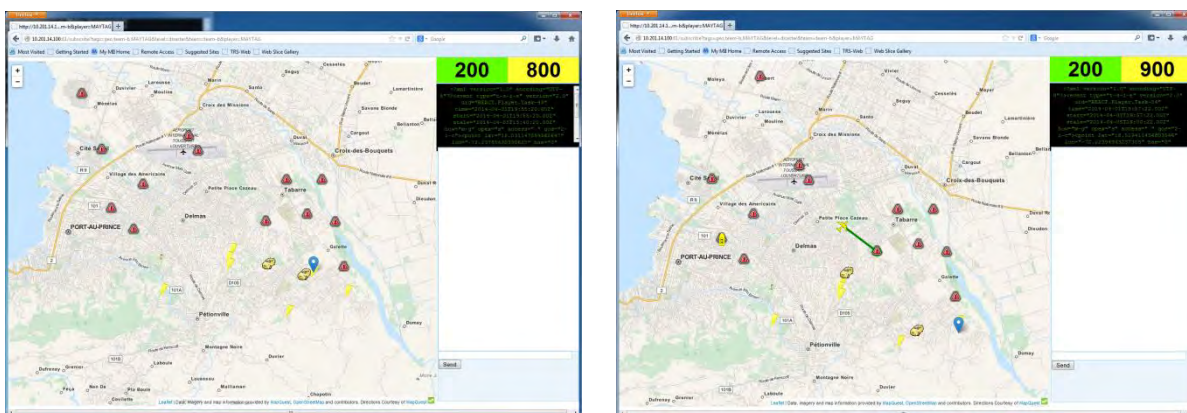
### 4.3.2 What went right

Local and remote developers connected their systems to the DIGEX and received various dynamic CoT messages provided by a flexible simulation backbone. As in past years, the Program Office made use of MITRE's Resources for Early and Agile Capability Testing (REACT) lab to provide this simulation functionality. This year's scenario provided focused scenario data for a disaster response in Haiti.

The process of gathering DIGEX simulation requirements began in January. There was a lot of discussion about who we should consider the "users" at the DIGEX. We came up with a few key requirements:

- Scenarios needed to be publicly released
- Day 2 scenario needed to emphasize the collaboration between DHS and DoD
- DIGEX activity needed to be more interactive and visually compelling rather than the "tracks on a map" visualization of past years
- UAVs with Sensor Points of Interest needed to be included
- Simulated entities needed to accept tasking from participants
- DIGEX needed to support remote participants at the same level as in-room attendees

To address the above, the REACT lab created a web-based game on top of the simulated entities where participants respond to alerts in a disaster response scenario. One team controlled the air surveillance assets and another controlled the ground repair crews. This technology satisfied the engineering-level data collectors as well as the high level VIP demonstrations. Through scoring, REACT was able to demonstrate the benefits of interoperability. Teams operated first in a "stovepiped" configuration where they could only see their own vehicles, then in a CoT-enabled configuration where information was shared between the displays for better situational awareness.



**REACT's DIGEX Interoperability Game (left: without CoT sharing, right: with CoT)**

The ISEE VPN network worked very well as the backbone for the DIGEX. Once the computers were configured for the DIGEX IP network, the REACT simulation system worked as expected. REACT-generated CoT messages were provided on the network and were successfully received by connected systems. The management of the event by ACME staff was very well done. To keep track of network configuration, such as port numbers and IP addresses, a persistent note on the DCO session provided the IP and port numbers. The REACT Interoperability game was successful at demonstrating the concept and benefit of CoT to those not familiar with the domain. REACT was also able to visualize a DHS/DoD drug interdiction scenario as a foundation for the CoT-NIEM demonstration on day 2.

A popular product from the DIGEX is the data collection. Several participants requested the collect and commented how they have used collects from previous DIGEXes in their CoT tools development.

### **4.3.3 What went wrong**

With all the various activities scheduled for the two day event, the agenda proved problematic for the DIGEX with many sessions overlapping. On day one of the DIGEX, there were several developer-level CoT presentations scheduled during the same time slot which made engineering-level participants pick one or the other.

The DCO system did not perform well for the DIGEX this year. Day one saw a crash of the DCO collaboration system during the DIGEX which caused many potential remote participants to log off after repeated attempts to join back in. This impact was felt in Day 2 where only one of the participants returned to the online DIGEX. In the ACME Lab where the DIGEX was physically hosted, microphones and the integrated sound system enabled verbal communication to remote attendees. Normally this works well with echo cancellation for teleconferences. However, DCO did not have typical telecon support, so remote users needed to talk and listen through their computers to participate. Use of this computer audio stream caused feedback problems for the room audio system so instant messaging chat was used via DCO to receive communications from remote participants. This mode of operation made customer service for the DIGEX community very difficult.

### **4.3.4 What could be done better**

A prime opportunity for improvement is the pre-event collaboration with attendees/vendors. We could do better asking specific questions of each potential attendee about what would provide value to them from a DIGEX. From talking to several of the participants, the DIGEX could potentially be its own virtual event considered “always on” for a few days. This does not necessarily have to coincide with the dates of the CoT UG event. During the CoT UG, it may be useful to have more of a “show floor” where vendors could show off their CoT capability. If simulation support is needed, REACT could provide tailored CoT feeds for participants.

While we held many pre-event coordination and brainstorming meetings, various risks that were identified early on such as external network access were only able to be mitigated at

the last minute due to ISEE staffing availability. REACT's game and simulations use commercial Internet services from Mapquest for maps and road routing so the availability of that access from the DIGEX network was critical. During the event, this access worked very well.

The REACT DIGEX game worked as expected but we could have done a better job explaining what the players could expect from the gameplay. A tutorial would address this concern.

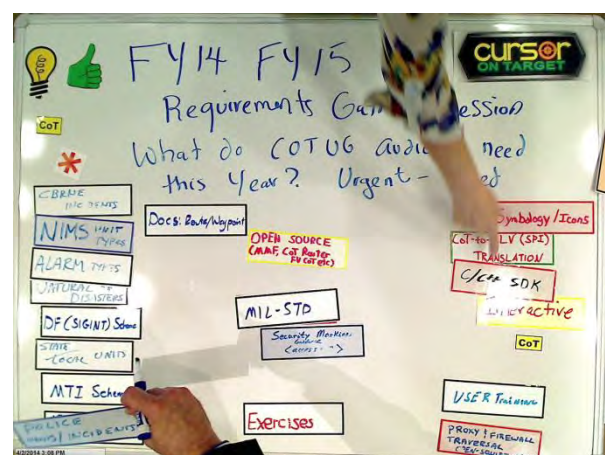
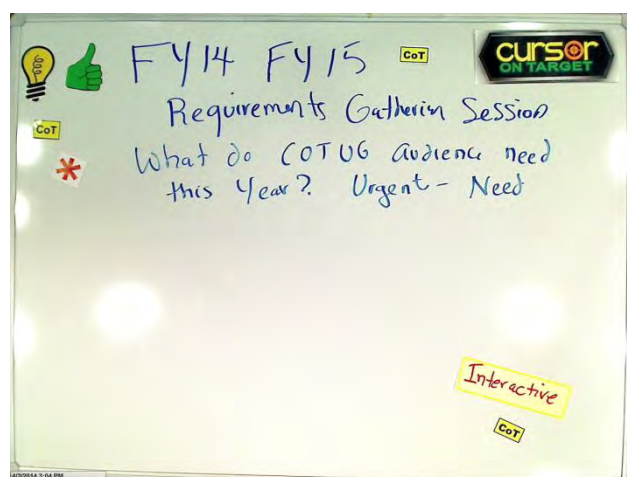
## 4.4 Requirements Gathering

MITRE's 2C130 auditorium has been upgraded since 2013 and the new features enhanced this year's user's Group Meeting. The new teleprompter supported an ability to monitor DCO chat comments, and the improved audio capabilities enabled better communication with remote participants.

As with the ACME lab, multiple system tests were conducted to ensure that audio, video, and integration with the Collaborative Story Development Kit were operational.

In order to set the stage for capture of requirements, we presented an overview of FY14 activities and potential FY15 priorities. The CoT team distributed laminated cards and Dry-Erase markers to the seating table areas prior to the start of session; during the overview users were encouraged to write their ideas down. After the overview, we collected the cards and began the requirements discussion.

The following images are screen shots of various points in the discussion process. You will note that the number of items increase along with an attempt to organize the emerging consensus.







The following requirements are listed in order of priority:

- Exercise Support: support at least one exercise in FY15. Colonel Butow (Commander, 129<sup>th</sup> Rescue Wing) recommended that participation in exercise SOARING ANGEL in FY15 would address not only user requests for support of Personnel Recovery, but also facilitate planning for his organization's deployment in FY15.
- Establishment of a CoT Mil-Standard
- Development of CoT Open Source: we are looking to provide more flexibility with regard to development and dissemination of user-initiated CoT applications
- Coordination of military assets in a non-traditional space
  - a. Chemical / Biological / Radiological / Nuclear / Enhanced Conventional Weapons defense
  - b. Natural Disaster response
  - c. Integration with Department of Homeland Security
- Emergency Medical Support: this priority aligns itself with the Personnel Recovery mission.
- Expansion of the CoT SDK: we received several requests for development of a C++ COT SDK.
- User training / dissemination of "best practices"

Although user feedback was generally positive, we received comments indicating that attempting to conduct both the DIGEX and Requirements Gathering session in parallel was a mistake. There were multiple users who wanted to attend both sessions, and were unable to do so.

## 4.5 ACME Lab support

Major tasks associated with this year's CoT User Group meeting included:

- Designing ACME Lab floor space and systems network (DIGEX REACT, CoT Systems interaction, Vendors, Collaborative Story Development Kit)
- Evaluating and testing the DCO system with the MITRE Corporate staff and systems.
- System integration testing
- Development and production of artwork supporting the meeting (e.g., CoT-Enabled System information boards)
- Coordination with Corp Audio Visual staff for production of the meeting and capture of presentations for future distribution)
- Post-Event audio / video processing

During the event our MITRE staff worked as part of the CoT team, supporting online attendees and working to assure acceptable quality of digital and video feeds for virtual attendees.

### 4.5.1 What went right

We set up a live feed from the main conference room (the auditorium, 2C130) just outside the ACME lab. This was extremely helpful for the DIGEX and meeting participants who needed to be in two places at once, allowing them to focus on their primary tasks in the ACME lab but also listen to the meeting. We observed constant traffic past this live feed, with people watching for a short time before either taking up tasks in the ACME lab or deciding to join the activities in the auditorium.

We found that our communication plan was effective. We wrote an article for the Hansconian (Hanscom Air Force Base's weekly publication), and this generated increased local interest in the meeting. We employed MITRE's corporate services such as MAID, Community Share, Morning emails, and corporate print services to publicize the meeting to MITRE staff and external stakeholders. The CoT Program Office sent monthly emails to the 1700+ member of the user group, starting in January; these emails became weekly emails during the four weeks prior to the User Group Meeting.

We leveraged MITRE's Audio Visual team to facilitate recording of presentations and for the post-meeting processing into video "chunks" (15 minute slices of a presentation) which we believe to be valuable for users who cannot devote an hour to watching a presentation. In past years we have received positive feedback from users who were unable to attend the meeting, but who could review the presentations at a later date. We anticipate similar feedback this year.<sup>1</sup>

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<sup>1</sup> Note: these chunks have been developed so that "slice 2" overlaps the end of "slice 1" by approximately 15 seconds, giving the viewer an ability to re-engage on a presentation when viewing has been interrupted.



The Requirements Gathering audience (approximately 30 people both physically in Bedford and virtually participating via DCO), were able to interact and contribute their individual ideas while also given an opportunity to elaborate verbally.

There was a teleprompter view for Jon Jacoby so he could see the “live” online audiences ideas and incorporate them instantly during the collaborative session.

The COps room of the ACME lab was configured for two offline breakout sessions (“CoT SDK” and “CoT-101”). Both sessions were well attended, and indicate a continuing need for CoT training and education.

## **4.5.2 What could be improved -- Recommendations for next year**

The ACME lab could have been better utilized. While the room design supported many people interacting with the DIGEX and provided space/network/tables for 11 separate CoT systems to set up and share their work, there was only one group that took advantage of the resources. Either we overestimated the requirements, or we were unable to generate sufficient interest for using the lab as we had envisioned.

We did not remember to have presenters remove their badges; in some cases, this caused problems with video captures.

We need to remind audience members to use the microphones (either on the table, or the handhelds) when they ask a question. We may failed to capture important dialog and information in the conference room.

The DIGEX could have employed more instructional material, e.g.:

- Posters explaining how to leverage this exercise
- Background information on the DIGEX, how it can/does interact with systems, and desired outcomes

## **4.6 Presentations**

### **4.6.1 CoT-NIEM**

The purpose of the CoT-NIEM presentation was to introduce the CoT community to the CoT Program Office’s effort to create a National Information Exchange Model (NIEM)-based serialization of the CoT paradigm. The presentation gave an overview of NIEM, explained why the CoT-NIEM effort was undertaken, and explained the deliverables of the CoT-NIEM effort. The deliverables included the CoT-NIEM information exchange, and a CoT-NIEM translator that is able to do a lossless translation between CoT-NIEM and CoT v2.0.

The presentation was well received, and prompted several questions including:

- **Q:** How will CoT-NIEM work in bandwidth reduced environments? **A:** Either compress or use CoT v2.0
- **Q:** Does CoT-NIEM complement CoT v2.0 or will it take over as the next version of CoT v2.0? **A:** CoT-NIEM complements CoT v2.0. It is a NIEM-based serialization of

the CoT v2.0 concepts meant to enable systems using NIEM-conformant exchanges to utilize the CoT paradigm and existing CoT resources.

- **Q:** How does CoT-NIEM handle community extensions for typing and subschemas?  
**A1:** CoT-NIEM has a field with an enumeration for the CoT types distributed by the CoT program office. Additionally, it has a type extension field to enable users to add additional typing information to the type hierarchy as they see fit. **A2:** CoT-NIEM contains NIEM versions of the stable CoT subschemas provided by the CoT program office. Additionally, it has a community extensions field that allows users to provide any information they deem necessary to augment the CoT-NIEM message.
- **Q:** How long do you anticipate the NIEM CIO guidance persisting in the DoD domain?  
**A:** Unknown. NIEM was originally developed as a ground-up effort within the Department of Justice. It was later also adopted by the DHS and has seen success in those realms. DoD adoption facilitates future interoperability efforts. Our goal for providing the CoT-NIEM translator at this point is to get out ahead of the NIEM effort and give it every possible chance of succeeding in the DoD.

Additionally, the CoT-NIEM team set up a lunch-time demo of the CoT-NIEM translator. It was poorly attended, but they were able to show the demo to a large crowd during the DIGEX demo period.

#### 4.6.2 CoT SDK 2.0

Expanding domestic and international interest in CoT has resulted in a steady stream of new Cursor on Target users seeking information on how to quickly CoT-enable their systems. These new users were the focus of the Day One presentation: CoT Overview and Software Development Kit (SDK) (LBonanno, CPeers, KGibson).

As background, the CoT SDK is a software library intended to lower the barrier of entry for new Cursor on Target developers. The SDK consists of common code to construct, parse, and manipulate CoT event messages. By leveraging this common code, developers are able to focus on their system specific details and build out a CoT plugin more rapidly. The SDK's overarching principle is to favor simplicity over power and complexity, and make it difficult for users to create an invalid CoT message. Version 1.0 of the CoT SDK was delivered to the CoT user Community in April of 2013. Version 2.0 is an extension of Version 1.0, and it will be delivered to the CoT user Community in May of 2014.

For the briefing, two MITRE conference rooms were used in an effort to target the different technical levels of the general audience. First, room 2C130 (auditorium) was used to present the CoT and SDK high level overview. Users gained understanding of what it means to "CoT-enable" a system and how to use the CoT SDK without looking at a single line of code. Users were highly engaged during the briefing, and asked many questions. Secondly, an ACME classroom was used to dig into the code and demonstrate actual usage of the SDK. The room had three stations set up for hands-on coding example demonstrations (java SDK, .NET SDK, networking demonstrations). Users were able to

visit the stations, ask specific coding and architecture questions, and get comfortable with the SDK tools and usage.

The two room format was very effective. The following observations were noted during the presentation and demonstrations:

- Users want to learn about CoT tasking. A *CoT Tasking 101* would be well received during next year's conference.
- Users want guidance with respect to CoT and mobile applications. Questions were raised about CoT and transport.
- There are new users at the CoT meetings every year, and they are very interested in a basic CoT overview. They want to learn exactly it means to CoT-enable a system. They want to understand how to write and effectively debug a CoT plugin. They want to learn more about the tools to help them CoT enable their system (SDK, Debug Tool, FVCoT, etc.)
- Users would like a C++ SDK library
- Users would like additional subschema support in the CoT SDK

#### **4.6.3 CoT Mil-Standard**

MITRE provided an update on the status of MIL-STD development and presented issues raised by the AFSIB (Air Force Standards Interoperability Board) in their review of the current draft. The AFSIB is the Air Force representative to US Joint standards boards, and is responsible for proposing new MIL-STDs for approval of the Joint community, as well as representing Air Force interests in configuration management decisions.

There was disagreement among the attendees concerning the value of a CoT MIL-STD and what "price" they were willing to "pay" in terms of potential modifications to current CoT practices and implementations. Future discussions should focus on the trade-offs involved and have the goal of reaching consensus. The question of how much influence the CoT User's Group will really have over future direction of the CoT standard also needs to be considered by the CoT Program Management Office.

The CoT Program Management Office has the final say in how to move forward with changes to Cursor on Target. But if this is not in line with what the users want, other stakeholders (e.g., the AFSIB) will have questions concerning those decisions and approval of the CoT MIL-STD could be delayed.

## 5 Attendee Meeting Feedback

### 5.1 Assessment: What the Feedback tells us

While the number 1 priority for attending was the presented material, “networking” was also very high on the list. Some of the comments (see para. 5.4) indicate that we need to enhance the ability of attendees to meet with each other and investigate opportunities for collaboration.

Our selection of the MITRE facilities was a good one, and the hard work performed by the architecture team to ensure that audio and video were accessible / stable paid dividends.

Users were asked to pick their top three presentations on both days. On Day 1, by the metrics of “Most Interesting” and “Total Votes”, AFRL’s ATAK presentation and the ForceX presentation on use of CoT in Fire Fighting were the clear favorites.

On Day 2, there was less correlation between “Most Interesting” and “Total Votes”. The favorite presentations on Day 2 were BAO Kit and ATAK, but the total number of votes for each presentation were relatively equal:

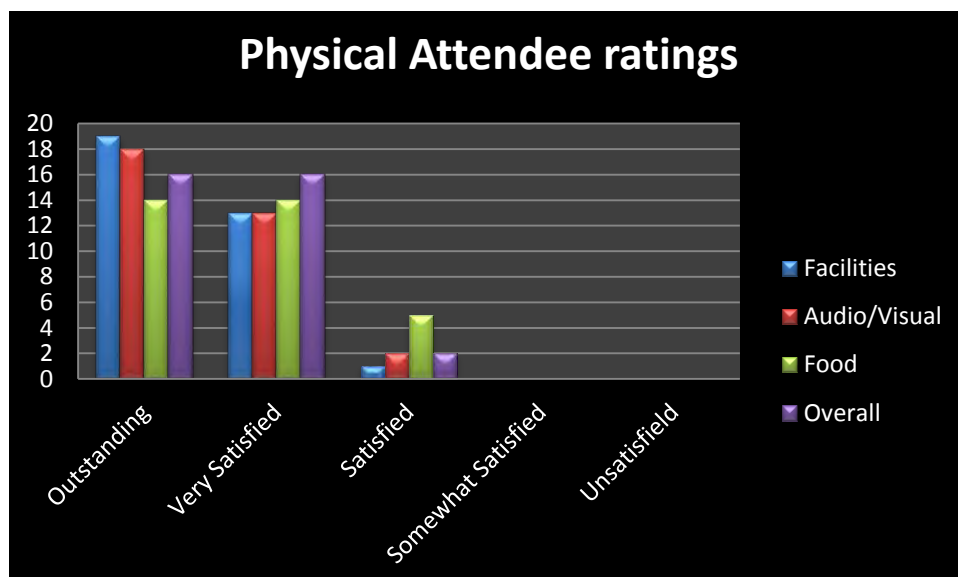
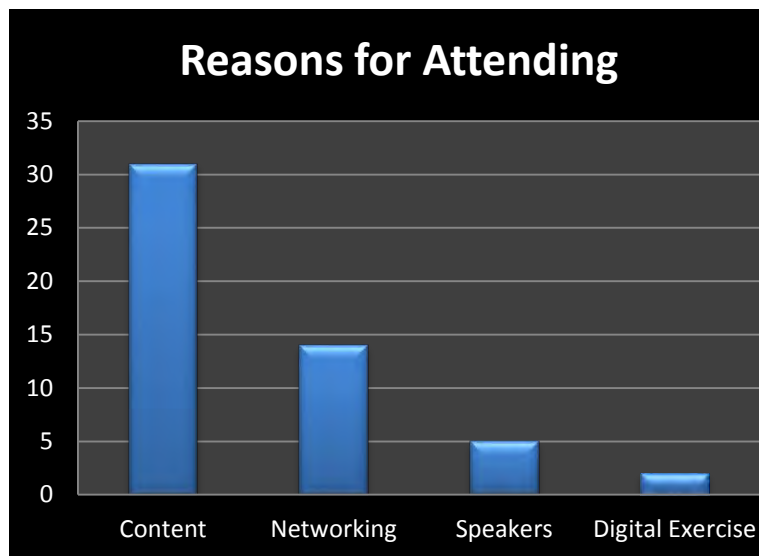
- BAO Kit: 21
- Small UAV Geo-location: 16
- Mil-Standard: 16
- ATAK: 15
- Wide Area Surveillance: 14
- CoT-NIEM Integration: 13

Given the comments concerning Use Cases, it would appear that attendees are hungry for real-world applications of CoT technology.

The lack of feedback on Day 1 virtual attendance would appear to reflect the problems we had with DCO connectivity. Another possibility is that feedback was not collected until Day 2, and the Day 2 assessments reflect ratings for both days.

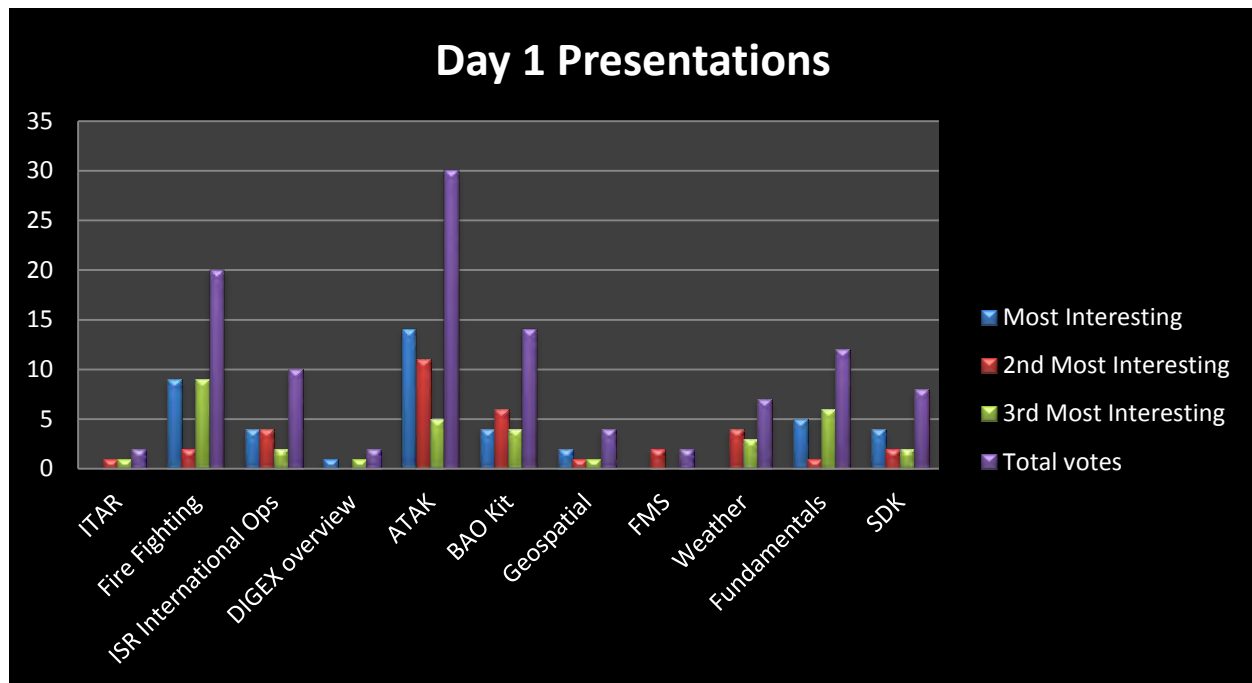
It appears that the User Group Meeting satisfied user expectations.

## 5.2 General feedback

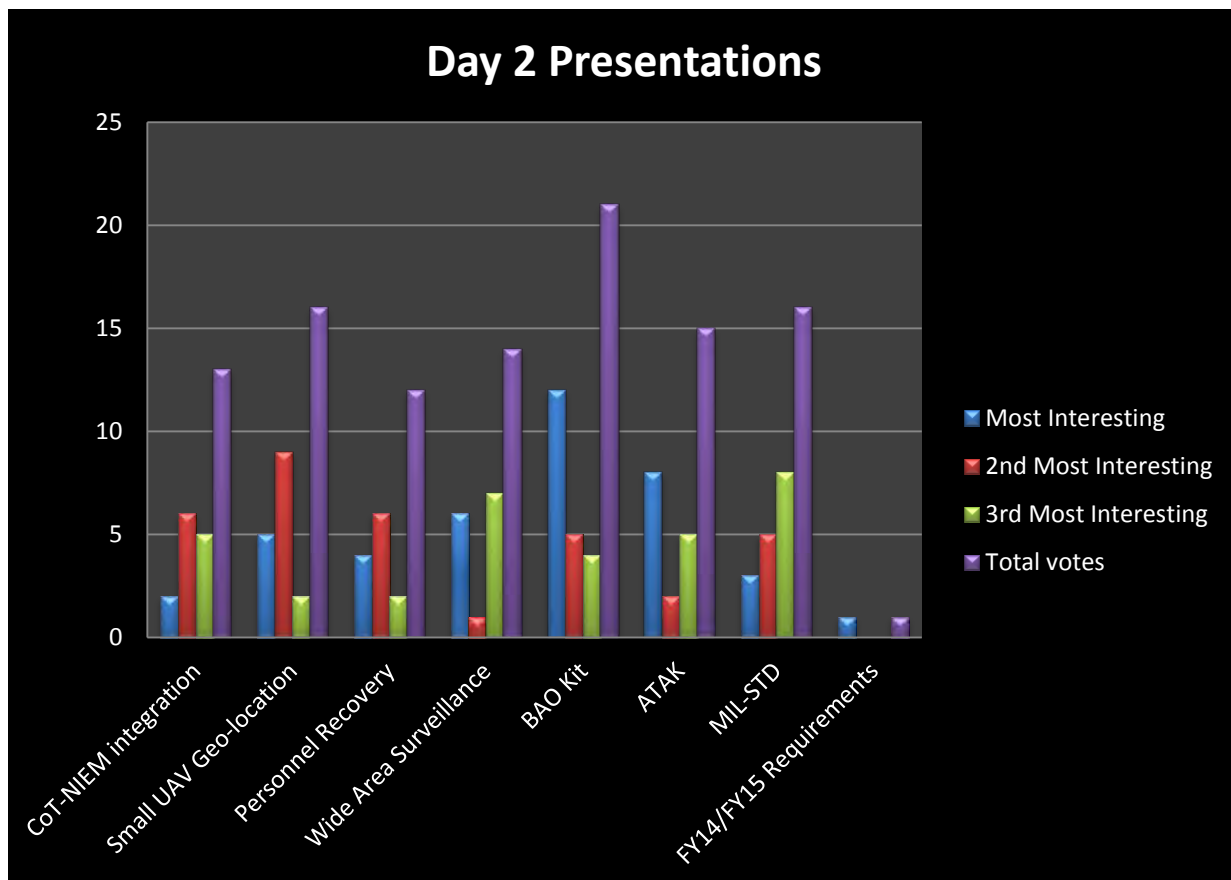
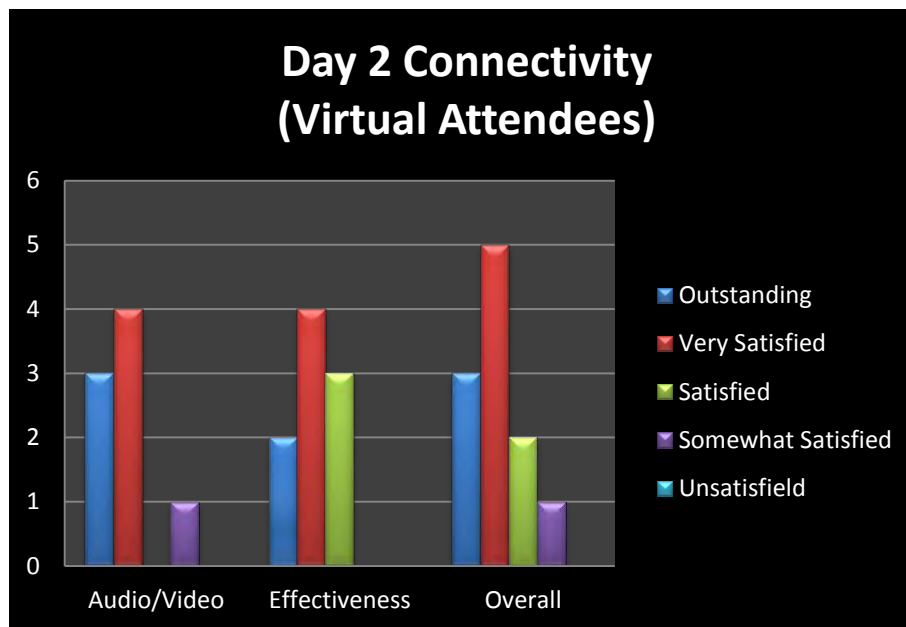




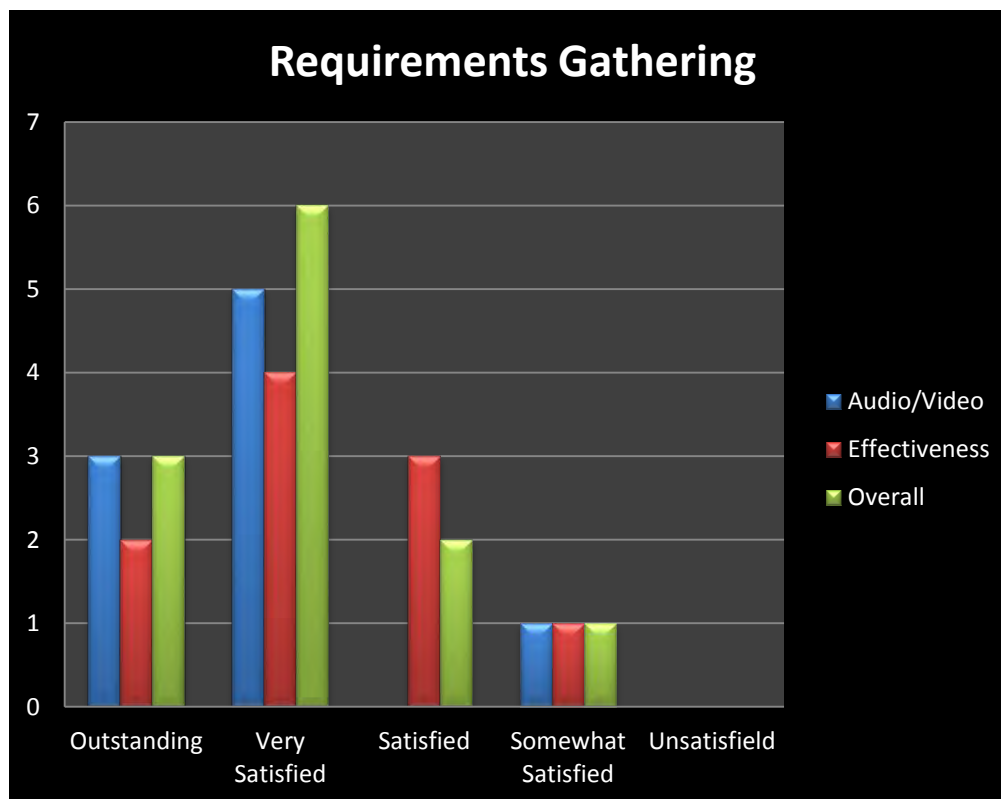
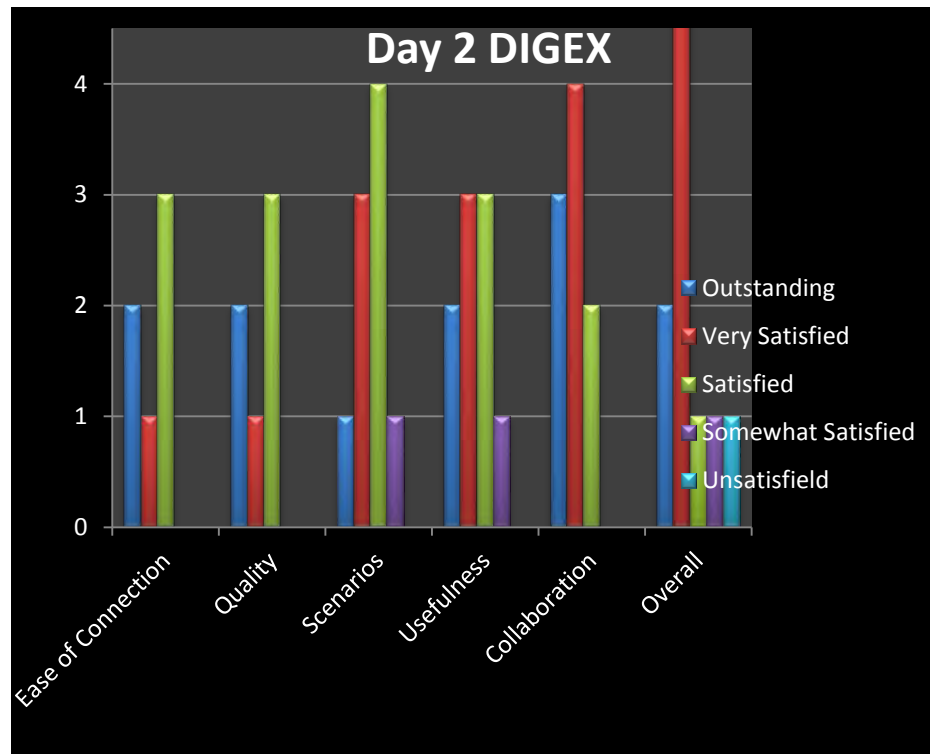
### 5.3 Day 1 feedback (International Day)



## 5.4 Day 2 feedback (US-only participation)







## 5.5 Survey Comments

Most Beneficial aspect of meeting?	How can we improve the meeting?	What other topics are of interest to you?
Networking (Talking with other users)	Break down into use cases before getting into technical details	Use cases, DoD vs Civilian
Networking (interacting with a wide group of users)	DIGEX should not be run concurrently with other briefings	
Briefings (Learning about new initiatives, innovation & future challenges)		More on domestic operations
DIGEX data	Explain conventions around standard use	Integrating CoT in High Availability / Disaster Recovery
Content & Networking	Would like to know more about what others are doing with CoT	Add speaker contact info to the agenda
Networking (interactive discussions with other attendees & speakers)		Use Cases, additional schemas data flows (not just schema definitions)
CoT Basics (understanding what CoT is and how it is used)	Make the briefing slides available prior to the briefing for ease of note taking	
Content (speakers, sidebars, etc.)	CoT West! (not sure what that comment means)	
Content (presentation)	Hard to say	DHS All-Hazards (Disaster & Terrorist Response)
CoT Basics (gave me needed exposure to CoT; what it does and what it could do)		
Networking (contact with military personnel & vets who use(d) digital tactical systems)	More scheduled time for networking	
Content (education on the potential uses for CoT)	Wished for more education opportunities as opposed to briefings	More focus on operational use of CoT

<b>Most Beneficial aspect of meeting?</b>	<b>How can we improve the meeting?</b>	<b>What other topics are of interest to you?</b>
Content/Networking (presentations and discussions)	Recommend "CoT Introduction" session on the day prior to the conference for new folks	Good for now
CoT Basics (learning about CoT & how it's used)		
Content (learning about other users & their use/application of CoT)		
Networking (contacts)	More specifics	Specific message to get a task done, access to documentation
MITRE staff	more Networking	
Networking (finding POC/SME on CoT)	None	Can't think of anything besides what was addressed
Support (getting long standing issues addressed and ironed out)		CoT to KLV translation, CoT Security
Content/Networking (meeting & demo w/CoT users)		
Networking (collaboration conversations)	Vet slides; truth in advertising	Use of CoT for data normalization, Intelligence capabilities, First Responder/Medical sub set, suggest cool fire technologies
CoT Basics? (Tutorial)	Parking	More info on subschemas & guidelines
Networking (CoT users I don't get to see on a regular basis)	maybe an hour set aside for extra discussions between vendors	SIGINT
Networking (interaction with other users in the community)		
Content/Speakers		

Most Beneficial aspect of meeting?	How can we improve the meeting?	What other topics are of interest to you?
Hearing where things are going. Definitely want CoT to be standardized.	Provide at least a temporary password or similar to get to the CoT schemas, debugger etc. for downloading.	Before the next meeting, take in written questions regarding the use and applications of Cot. My interest is specifically using CoT to produce 9-line targets etc., what CoT messages are used to provide the 9-line functionality, and what are the limitations. What are the typical start, stop and stale time settings etc.
Learning about the range of current CoT applications, and developmental issues.	Encourage more foreign participation, especially in Bedford.	
Warfighter perspective (e.g. Mr Danforth from BAO kit office) Android Tactical Assault Kit presentation		
Learning about how others use CoT and using that knowledge to consider new implementation/enhancement to my organization's projects.		I thought the content was all good. I can't think of anything else.
The ISR briefings		
Information from presentations	Improve audio for remote viewers, e.g. when someone asks a question from the audience either repeat the question or give them a mic!	
Knowledge and roadmap of CoT and see uses in industry	If it is kept as a two day personal meeting, I don't have much input as I attended virtually. If virtual presents is going to be adopted, then go for shorter, more frequent meetings, perhaps "webinars" on specific topics. 8 hours per day was a long time to hang out on an internet connection.	

Most Beneficial aspect of meeting?	How can we improve the meeting?	What other topics are of interest to you?
Networking/Presentations (came specifically for Ralph Kohler's presentation, networking also good)	Arrange so there is no overlap between DIGEX & presentations; that would be optimal	Progress toward implement CoT in international community (approved TAA's or licenses)
Learning about current CoT status		

### Additional Comments

- Arrangements for virtual participation very well done.
- Good Job staying on schedule!
- Need to ensure audience participants have microphone, when asking questions, etc.!
- Working through local network politics so hopefully we can participate in DIGEX next year. It was better this year with the pre-tests; at least I knew what the problem was, unfortunately the wheels of government grind too slowly. Perhaps putting out ports and protocol with initial meeting notice would help facilitate coordination of opening ports and protocols so we can participate next year. Connection dropped out periodically, speaker had to be reminded to talk into mic, but all-in-all was easy to use and follow.
- BAO Kit briefing was very enlightening.
- I love the MITRE campus!
- Very profession meeting. All my requirements were addressed. Thank you!
- I wanted to participate in the DIGEX but the network Nazis on my end wouldn't open up the ports!
- Did come away from DIGEX with an understanding of what the CoT routers do.
- Disagree with prioritizing DIGEX & taking time from requirements gathering and question doing requirements last when many have already left for the airport.
- The DIGEX scenarios demonstrated a realistic application of CoT.
- Would like to see incorporation of multi-sensor platforms in the DIGEX.
- Great experience. Have much better understanding of what CoT is. Very well run user group
- Thanks for all the support, very good conference & I appreciate the opportunity to attend.

## 6 CoT User Group Pictures

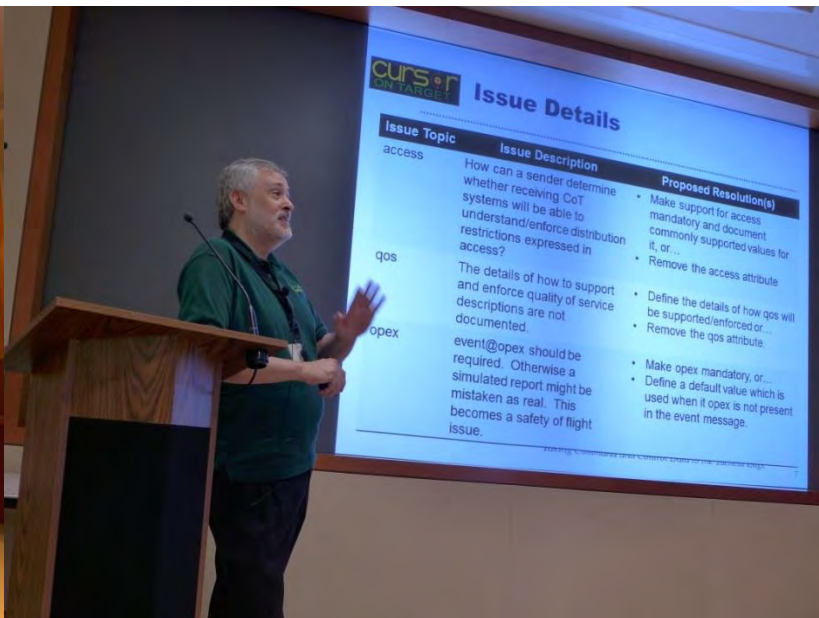


Paul Hastert (HAF/A2I)

Col Stephen Butow (Commander, 129 RQW)



Laura Bonanno (MITRE)



Mike Cokus (MITRE)



After Action Report: International CoT User Group Meeting (1-2 April 2014)

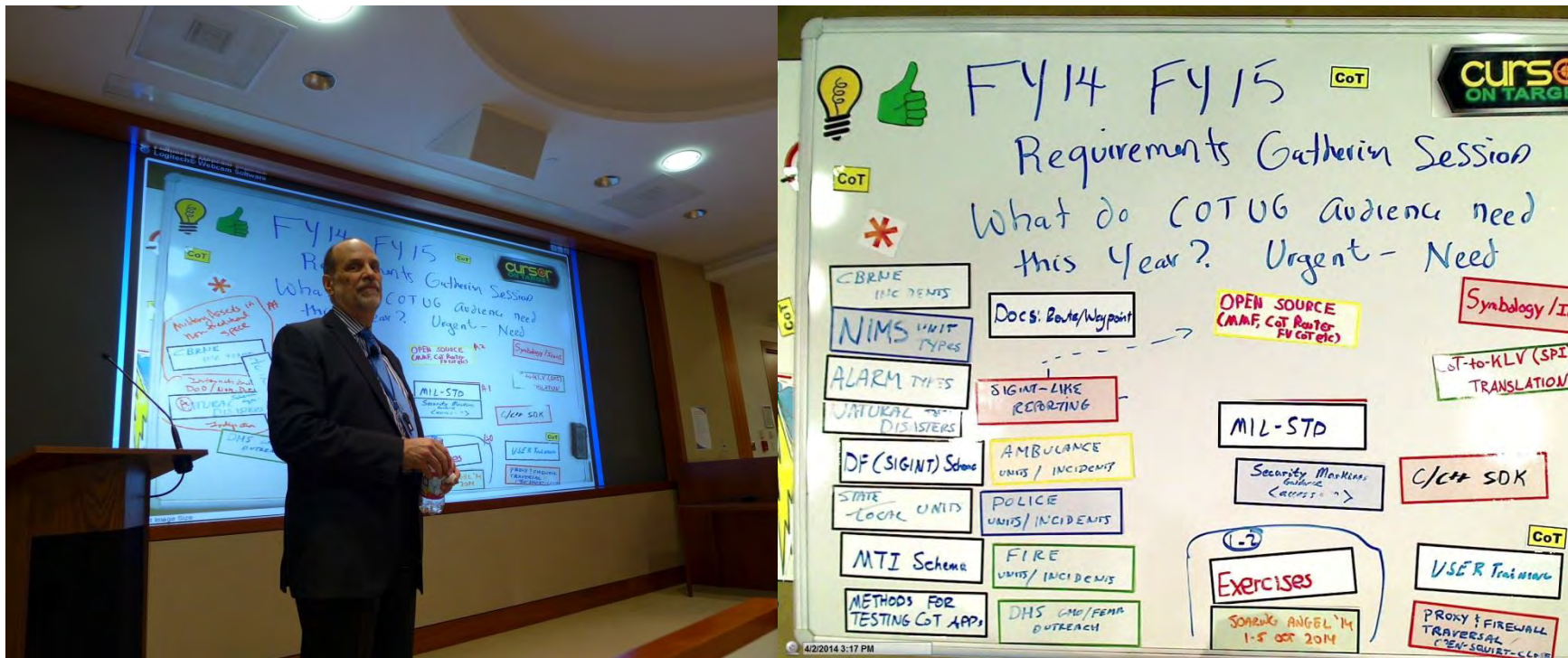


**Bill Leavis and Col Anthony Genatempo (AFLCMC/HNA)**



**2C130 Auditorium / ForceX presentation (Luke Savoie)**





Jon Jacoby (MITRE)

Requirements Gathering

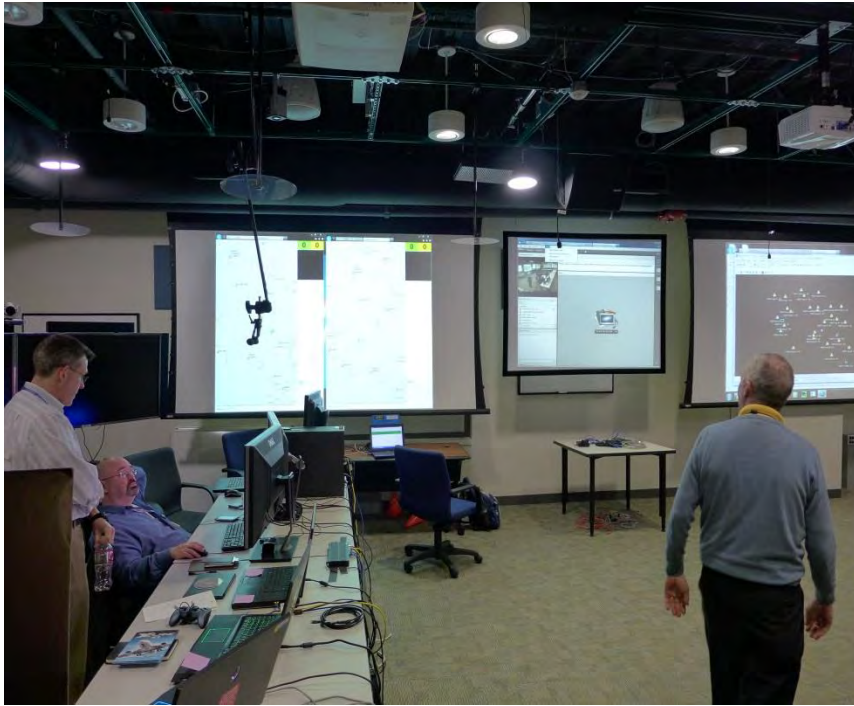


ACME Lab



Mike Dinsmore (MITRE) conducts briefing on REACT simulation





**DIGEX preparation**



**DIGEX preparation**



**DIGEX evaluation**



**Ernie Carozza (MITRE)**

## **7 Summary**

The FY14 Cursor on Target Annual User Group Meeting took into account the growing number of CoT users, their need to minimize travel costs due to Sequestration, and continued last year's efforts to incorporate participation by International stakeholders. In doing so, we successfully leveraged a new architecture incorporating Defense Connect Online and MITRE's Information Sharing Experimentation Environment, developing a capability which should be able to meet the needs of future CoT education, training, and collaboration requirements.


## **Appendix A: CoT-enabled System Poster Samples<sup>2</sup>**

Reference to any specific commercial product, process, service, manufacturer or company does not constitute an endorsement, recommendation or favoring by the U.S. Government or the MITRE Corporation.


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<sup>2</sup> Some posters could not be included due to the requirements for Public Release





## Cursor on Target Users Group 2014



**Name:** VISTology HADRian

**Primary Objective:**  
Provide near-Real Time Situational Awareness to HA/DR incident commanders

**Sub-Objective:** *Dynamically integrate multiple information streams  
(CoT and not) into COP for HA/DR ops by means of semantic annotations*


**Issue that technology attempts to resolve:**

- Selective integration of ad hoc sensor information into COP via machine reasoning
- HA/DR EEI (Essential Elements of Information) answering from social media and other information
- Geofencing

**Description of technology:** HADRian is next-generation Common Operational Picture software for HA/DR ops. HADRian enables an Incident Commander to **Find, Filter, Geocode, Display and Dispatch** the information necessary to make the best decisions about the situation on the basis of semantic annotation of information repositories. Repositories or information streams that are integrated into the HADRian COP can include text reports, social media, photos, streaming or static video, traffic cameras, GPS tracks, chemical plumes, 3D building models (SketchUp) and other sources of information as they are identified.

**Contact Name:** Brian Ulicny, PhD      **Phone:** (508) 788-5088  
**Email:** bulicny@vistology.com      **Website:** VISTology.com

**Taking Command and Control Data to the Tactical Edge**  
Distribution A. Approved for Public Release, distribution unlimited.



VISTology, Inc.



## Cursor on Target Users Group 2014



**Name:** ARC<sup>3</sup> (Augmented Reality Command, Control, Communicate)

**Primary Objective:**  
*Deliver heads-up visualization of tactical geo-registered information for dismount operations and immersive training*

**Sub-Objective:**  
➤ Provide real-time SA (e.g., blue forces, aircraft, GCMs, avatars) on see-through displays and night-vision goggles

**Issue that technology attempts to resolve:**  
➤ Heads-up access to SA eliminates need to look down at computing devices  
➤ Delivers overmatch capability to the infantry squad  
➤ Enhances protection, lethality, and mission OPTEMPO

**Description of technology:**  
*Accurate mobile outdoor head tracking; low-latency rendering in through-sight displays; interfaces to CoT network to support small-team coordination*

**Contact Name:** Dave Roberts  
**Email:** droberts@ara.com

**Phone:** 919-582-3300  
**Website:** www.ara.com

**NVG**



**See-through display**



*\*Technology developed on DARPA ULTRA-Vis program and ARA IR&D*

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## Cursor on Target Users Group 2014



**Name:** Mission Planning - ctMPS™/CoT

**Primary Objective:**

To demonstrate real-time Collaborative Mission Planning using CoT.

**Sub-Objective:**

To demonstrate / evaluate CoT feeds in Collaborative Mission Planning.



Reduce Tactical Mission Plan Generation Times  
Reduce Communication Related Data Errors and Eliminate Replanning  
Enable Machine to Machine (M2M) Communications for Rendezvous Points  
- Targeting, Refueling, Multi-Modal Routing

**Description of technology:**

ctMPS™ provides real-time collaborative mission planning for tactical units as an add-on to PFPS. By including support for CoT subscription / publication, we will enable M2M communication with ctMPS™ capable mission planning cells to coordinate tactical planning in real-time.

**Contact Name:** Joshua Trainer


**Email:** JTrainer@CollaborationTech.net

**Phone:** 401 234 1145

**Website:** www.CollaborationTech.net

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## Cursor on Target Users Group 2014



**Name:** CoT-Enabled Link-16 DLP and Simulator

**Primary Objective:**  
Shared Situational Awareness between Link-16 and CoT tactical edge networks




**Sub-Objective:**  
Provide a tactical-oriented testing, simulation, and operations software suite for UxV payloads

**Issue that technology attempts to resolve:**  
Real-time communication between multiple Link 16 networks and multiple CoT networks is required to enhance situational awareness between tactical edge warfighters on different, possibly disconnected, data links.

**Description of technology:**  
A beyond-line-of-sight UAV multi-link communications payload with native, automated, unattended Link-16 and CoT data link processing, translation, routing, and multi-radio control  
Network and radio simulation and testing using TCG's CoT-Enabled BOSS  
Harris' TEN-G and TCG's CoT-Enabled Link-16 data link processor and radio control

**Contact Name:** Peter Ellis  
**Email:** Peter.Ellis@g2tcg.com  
**Phone:** 978-654-4800  
**Website:** www.g2tcg.com



***Taking Command and Control Data to the Tactical Edge***

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## Cursor on Target Users Group 2014



**Name:** Portable Test Range

**Primary Objective:**  
*Demonstrate flight test range command and control capability without the need for usual test range infrastructure*

**Sub-Objective:**  
➤ Explore alternatives to the usual UDP and TCP for CoT message transport

**Issue that technology attempts to resolve:**  
➤ Develop a messaging architecture that is easier and more reliable than current techniques  
➤ Develop a messaging architecture that simultaneously supports CoT and other protocols  
➤ Explore the efficacy of alternative comm channels such as cell, Iridium, Inmarsat, Point to Point

**Description of technology:**  
*The Portable Test Range (PTR) demonstrates test range style TSPI tracking, C2, and communications services using a variety of commercially available data link providers. A unique feature of PTR is the use of Publish – Subscribe as a network transport, greatly simplifying network setup of CoT messaging. PTR is an Internal R&D Development program of the Georgia Tech Research Institute.*

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Problem. Solved.

Approved for Public Release. Distribution unlimited

**Taking Command and Control Data to the Tactical Edge**





## Cursor on Target Users Group 2014



**Name:** TacitView

**Primary Objective:**  
*Enable processing, exploitation, and dissemination of FMV.*

**Sub-Objective:**  
*Allows analysts to find, scrub, view, improve, tag, edit, annotate and publish motion imagery across the enterprise during all phases of exploitation*

**Issue that technology attempts to resolve:**

- Receive and display CoT Messages with correct temporal and geospatial characteristics
- Single application providing all elements required for successful PED

**Description of technology:**  
*Application with a smart workflow engine, TacitView will listen on an incoming UDP port and publish CoT messages to an interactive 3-D globe along with overlays of live FMV.*

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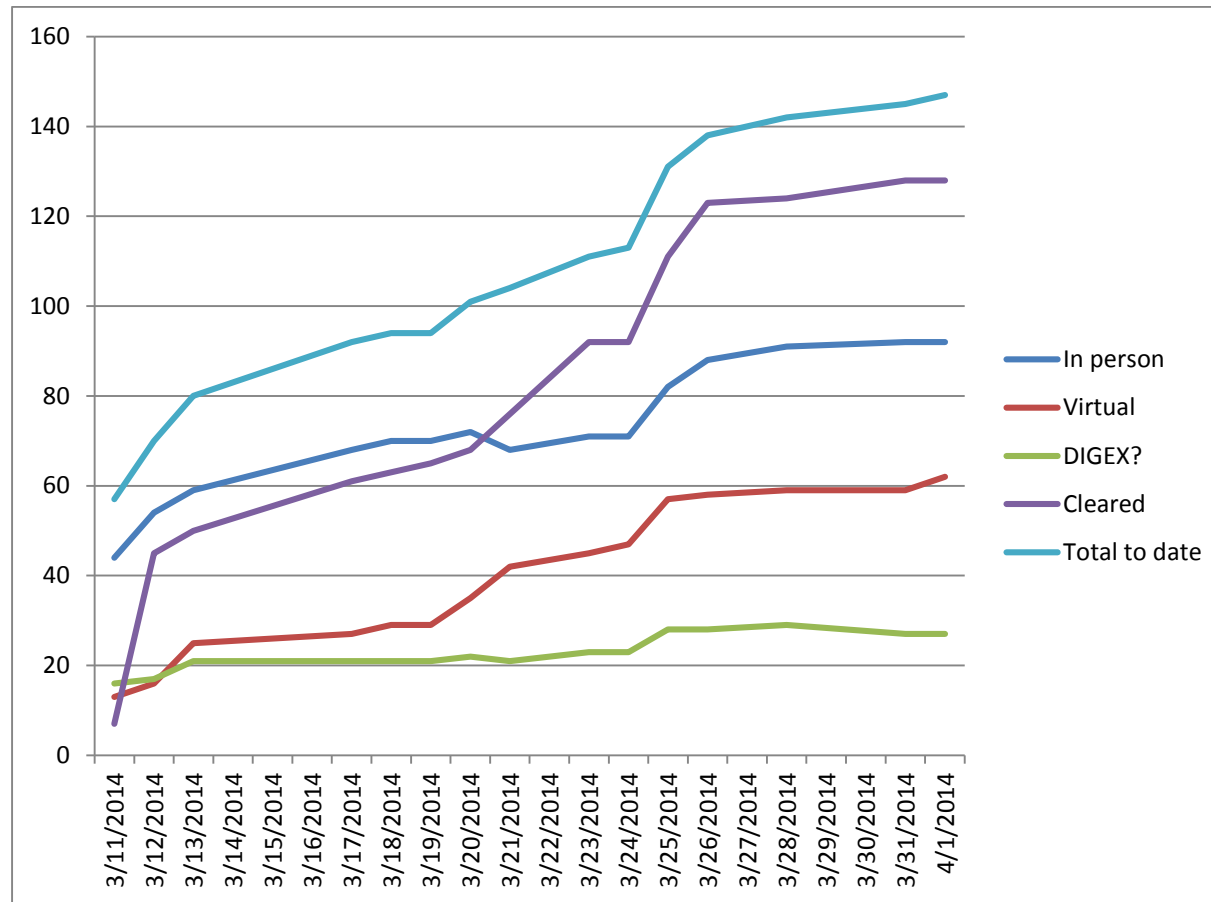


**Distribution A. Approved for Public Release, distribution unlimited.**

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## **Appendix B: Participant Statistics**



This table reflects the timeline associated with users providing RSVPs for the FY14 Annual User Group Meeting. “Cleared” connotes an individual who is: 1) a US citizen; 2) has a need to know; and 3) whose proof of both has been received. Thirteen US citizens were not allowed to participate in Day 2 because they failed to provide this information; the balance of the un-cleared were foreign participants (4 from Finland, 1 from the UK, 1 from NATO).